

WHAT IS CLAIMED IS:

1. A plasma processing apparatus comprising:
a process chamber including an opened ceiling and an internal space
which can be evacuated;

an insulating plate divided into a plurality of regions and airtightly
5 attached to the ceiling of said process chamber;

a mount base placed in said process chamber for mounting thereon a
workpiece to be processed;

a planar antenna member placed above said insulating plate and
including a microwave radiation hole for transmitting therethrough
10 microwave used for generating plasma, said microwave transmitted through
said insulating plate into said process chamber;

gas supply means for supplying a predetermined gas into said
process chamber; and

a heat medium path for flowing a heat medium along a line by which
15 said insulating plate is divided into a plurality of regions.

2. The plasma processing apparatus according to claim 1, further
comprising a ring-shaped heat medium path for flowing the heat medium
along a peripheral part of said insulating plate.

3. The plasma processing apparatus according to claim 1, further
comprising heat medium temperature control means for controlling the
temperature of said heat medium.

4. The plasma processing apparatus according to claim 3, wherein
said heat medium temperature control means controls the
temperature of said heat medium to render the temperature of said
insulating plate substantially constant in a normal process.

5. The plasma processing apparatus according to claim 3, wherein
said heat medium temperature control means controls the

temperature of said heat medium to heat said insulating plate to at least a predetermined temperature in cleaning.

6. The plasma processing apparatus according to claim 1, wherein said insulating plate is formed of a material selected from the group consisting of aluminum nitride, alumina and quartz.

7. The plasma processing apparatus according to claim 1, wherein said insulating plate is divided substantially radially from a central part of said insulating plate.

8. The plasma processing apparatus according to claim 1, wherein said heat medium path and the microwave radiation holes of said planar antenna member are displaced from each other with respect to the direction in which the microwave is transmitted.

9. The plasma processing apparatus according to claim 2, wherein said ring-shaped heat medium path and the microwave radiation holes of said planar antenna member are displaced from each other with respect to the direction in which the microwave is transmitted.

10. The plasma processing apparatus according to claim 1, further comprising a support frame member supporting said insulating plate divided into a plurality of regions, wherein said support frame member includes said heat medium path.

11. The plasma processing apparatus according to claim 2, further comprising a support frame member supporting said insulating plate divided into a plurality of regions, wherein said support frame member includes said heat medium path and said ring-shaped heat medium path.

12. The plasma processing apparatus according to claim 10,

wherein

said support frame member and the microwave radiation holes of said planar antenna member are displaced from each other with respect to the direction in which the microwave is transmitted.

13. The plasma processing apparatus according to claim 10, further comprising:

first sealing means for airtightly sealing between said insulating plate and said support frame member; and

second sealing means for airtightly sealing between said support frame member and said process chamber.

14. A plasma processing apparatus comprising:

a process chamber including an opened ceiling and an internal space which can be evacuated;

an insulating plate divided into a plurality of regions and airtightly attached to the ceiling of said process chamber;

a mount base placed in said process chamber for mounting thereon a workpiece to be processed;

a planar antenna member placed above said insulating plate and including a plurality of microwave radiation holes for transmitting therethrough microwave used for generating plasma, said microwave transmitted through said insulating plate into said process chamber;

gas supply means for supplying a predetermined gas into said process chamber; and

a support frame member supporting said insulating plate divided into a plurality of regions and including a heat medium path for flowing a heat medium along a line by which said insulating plate is divided into a plurality of regions and along a peripheral part of said insulating plate.

15. The plasma processing apparatus according to claim 14, wherein

said support frame member and the microwave radiation holes of

- 5 said planar antenna member are displaced from each other with respect to the direction in which the microwave is transmitted.

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